

# **95 An audit of the investigation, antibiotic management and clinical outcome of pulmonary exacerbations in patients with cystic fibrosis**

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**Background:** Patients with CF suffer repeated pulmonary exacerbations with clinical deterioration. Antibiotics are often commenced empirically and later refined upon results of antibiotic susceptibility testing of isolated organism(s).

**Aim:** To audit the bacteriology, sampling and management guidelines for pulmonary exacerbations in CF.

**Method:** We completed a retrospective case-note audit of patients attending the Children and Young Persons CF Unit, Nottingham UK (Jan 2005–Nov 2010). The respiratory sampling, antibiotic susceptibility testing and antibiotic prescribing guidance was audited. Episodes were classified according to the concordance between the antibiotics prescribed, antibiotic susceptibility profiles of isolated organisms and clinical outcome. First episodes for each patient were taken as the unit of analysis for the outcome analysis; differences between groups were tested using ANOVA.

**Results:** In total 257 exacerbations were identified, of which 91.1% had respiratory sampling documented. Antibiotic susceptibility testing was undertaken on 93% of episodes that isolated *P. aeruginosa*; no antibiotic prescriptions were changed due to the results. Outcomes did not differ between groups classified by antibiotic susceptibility, although the audit did not have sufficient power to detect a difference if such a difference were present.

Outcome for first exacerbation for each patient

Mean (sd)	Bacteria sensitive to both antibiotics prescribed n=10	Bacteria sensitive to only one antibiotic n=8	Bacteria resistant to both antibiotics prescribed n=4	One-way ANOVA p value
FEV1 % predicted n=19	3.00 (9.71)	15.80 (17.78)	5.25 (7.59)	0.18
BMI change (kg/m2) n=21	0.25 (0.34)	0.25 (0.43)	0.40 (0.31)	0.78
Time to next exacerbation (months) n=19	5.25 (3.73)	6.14 (3.08)	3.00 (0.82)	0.22

**Conclusion:** Management follows published guidance. Outcomes appear to be independent of antibiotic susceptibility-directed antibiotic selection.

# **96 New potential antibiotic sources for *Burkholderia cepacia***

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Bacteria belonging to the *Burkholderia cepacia* complex (Bcc) are significant pathogens in Cystic Fibrosis (CF) patients and are resistant to a plethora of antibiotics. In this context microorganisms from Antarctica are interesting since they produce antimicrobial compounds inhibiting the growth of other bacteria. This is particularly true for bacteria isolated from Antarctic sponges. The aim of this work was to check bacterial communities isolated from three Antarctic sponges for their ability to produce new natural drugs that could be exploited in the control of infections in CF patients by Bcc bacteria. Hence, 132 bacterial strains affiliated to different genera (e.g., *Pseudoalteromonas*, *Arthrobacter* and *Psychrobacter*) were tested (through the cross-streaking method) for their ability to inhibit the growth of 23 Bcc strains and some other human pathogens. Most of these bacteria completely inhibited the growth only of all the Bcc strains, suggesting a highly specific activity toward Bcc strains. The PCR amplification of genes coding for multienzyme complexes (PKS or NRPS) from the Antarctic bacteria revealed that only in few cases an amplicon of the expected size was obtained. Besides, the antimicrobial compounds are small volatile organic compounds (VOCs), and are constitutively produced *via* an unknown pathway. These data highlight the potentiality of Antarctic bacteria as novel sources of antibacterial substances to face Bcc infections in CF patients.

# **97 Use of artificial sputum medium to test antibiotic efficacy against *Pseudomonas aeruginosa***

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There is growing concern about the relevance of *in vitro* antimicrobial susceptibility tests when applied to isolates of *P. aeruginosa* from CF patients. During chronic lung infections in CF, *P. aeruginosa* populations exist in biofilms and a microaerophilic environment, whereas current tests use planktonic growth and aerobic conditions. In artificial sputum medium (ASM), *P. aeruginosa* growth mimics growth during CF infections, with the formation of biofilm structures and population divergence. The aim of this study was to develop an assay to study antimicrobial susceptibility of *P. aeruginosa* based on growth in ASM, and applicable to microaerophilic as well as aerobic conditions.

An ASM assay was developed in a 24-well format, using 3 days growth of *P. aeruginosa* prior to incubation with antimicrobial agents at different concentrations for 24 h. After biofilm disruption, cell viability was measured following staining with resazurin. The assay was applied to 16 *P. aeruginosa* under aerobic and microaerophilic conditions, and the MICs for tobramycin were compared with the results of susceptibility tests using standard broth growth. Whilst there was some evidence for increased MIC for tobramycin for isolates grown in ASM when compared to their planktonic counterparts, the biggest differences were found with bacteria grown in microaerophilic conditions, which showed a much increased resistance towards tobramycin in the ASM system compared to aerobic cultures.

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# **99 Antimicrobial susceptibility of anaerobic bacteria cultured from patients with cystic fibrosis (CF) and non-CF bronchiectasis**

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**Introduction and Aims:** Anaerobic bacteria have been detected in large numbers from the sputum of patients with CF and non-CF bronchiectasis. This study aimed to compare the susceptibility of these bacteria to a range of antibiotics used in the treatment of anaerobic infection.

**Methods:** The susceptibility (Minimum inhibitory concentration, MIC) of 78 anaerobic isolates (46 CF and 32 non-CF), including isolates from the genera *Prevotella*, *Veillonella* and *Actinomyces*, to 4 antibiotics (ampicillin, clindamycin, meropenem and metronidazole) was determined by E-test. Isolates were classified as susceptible, intermediate or resistant according to Clinical and Laboratory Standards Institute guidelines.

**Results:** Eleven CF isolates (23.9%) were susceptible to all four antibiotics with no isolates resistant to all 4 agents tested. Resistance to meropenem occurred in 2.1% of CF isolates with higher levels of resistance to ampicillin (21.0%), clindamycin (21.7%) and metronidazole (43.5%). In contrast, only one non-CF isolate (3.1%) was susceptible to all four antibiotics with none resistant to all 4 antibiotics. Levels of resistance amongst non-CF isolates were similar for meropenem (0%) and clindamycin (12.5%) but higher for ampicillin (43.8%) and metronidazole (68.8%).

**Conclusion:** There were high levels of resistance amongst isolates from both CF and non-CF bronchiectasis patients to metronidazole. Therefore, antibiotics such as metronidazole with putative antimicrobial activity against anaerobic bacteria may not be effective in the treatment of pulmonary infection caused by anaerobes.

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